CLAIMS

What is claimed is:

1.   A method of enhancing a bitmap image that may include text, line art and halftone imagery comprising:

providing a set of image processing templates, each image processing template associated
        with one of a plurality of image enhancement procedures;

storing said bitmap image at a bit depth suitable for processing by each of said plurality of
        image enhancement procedures;

windowing said stored bitmap image with each said image processing template to identify
        matching regions in said bitmap image suitable for processing by said associated
        one said plurality of image enhancement procedures; and

selectively applying said associated one of said plurality of image enhancement
        procedures to each said identified region to generate an enhanced raster image of
        said bitmap image.

2.   The method of claim 1, further comprising printing said enhanced raster image.

3.   The method of claim 1, wherein said plurality of image enhancement procedures includes resolution enhancement, halftone image enhancement, resolution doubling and toner conservation procedures.

4.   The method of claim 3, wherein all of said plurality of image enhancement procedures are applied to enhance print quality of said bitmap image.

16

5. A method of printing a bitmap image that may include text, line art and halftone imagery comprising:

providing a set of image processing templates, each template associated with one of a plurality of image enhancement procedures for improving image quality, said plurality of image enhancement procedures including a toner conservation procedure to reduce toner consumption;

storing said bitmap image at a bit depth suitable for processing by each of said plurality of image enhancement procedures;

windowing each said template over said stored bitmap image to identify regions in said bitmap image matching said template;

selectively applying said one associated of said plurality of image enhancement procedures to said identified regions to generate an enhanced raster image of said bitmap image; and

printing said enhanced raster image.

6. The method of claim 5, wherein said plurality of image enhancement procedures includes resolution enhancement technology (RET).

7. The method of claim 5, wherein said plurality of image enhancement procedures includes resolution doubling technology.

8. The method of claim 5, wherein said plurality of image enhancement procedures includes halftone image enhancing technology.

9.   An apparatus for enhancing complex bitmap images comprising:

a memory for storing gray value image data;

a multiplexer with multiple inputs, a single output and a selection line;

text and line art enhancement circuitry coupled between said memory and a first of said multiple inputs of said multiplexer;

halftone image enhancement circuitry coupled between said memory and a second of said multiple inputs of said multiplexer;

toner conservation circuitry coupled between said memory and a third of said multiple inputs of said multiplexer; and

enhancement mode selection circuitry coupled between said memory and said selection line of said multiplexer for selectively engaging said text and line art enhancement circuitry, said halftone image enhancement circuitry and said toner conservation circuitry.

10.   The apparatus of claim 9, further comprising a template database wherein said template database is a superset of templates representing all image processing modes requirements.

11.   The apparatus of claim 9, wherein said apparatus is implemented in an application specific integrated circuit (ASIC).

12.   A laser printer comprising:

a bus;

a processor connected to said bus;

a laser print engine connected to said bus; and

a first memory device comprising:

a halftone procedure;

a text and line art procedure;

a toner conservation procedure;

a resolution enhancement procedure;

a halftone enhancement procedure; and

a dynamic switching procedure for dynamically selecting and nonexclusively applying said toner conservation procedure, said resolution enhancement procedure and said halftone enhancement procedure to a complex bitmap image.

DOCKET NO. 10002891-1

13.   The laser printer of claim 12, further comprising a superset of templates controlled by said dynamic switching procedure representing mode requirements for said toner conservation procedure, said resolution enhancement procedure and said halftone enhancement procedure.

14.   The laser printer of claim 13, wherein said superset of templates comprises a template database stored in said first memory device.

15.   The laser printer of claim 13, wherein said superset of templates comprises a template database stored in a second memory device, said second memory device connected to said bus.

16.   The laser printer of claim 12, wherein said resolution enhancement procedure includes resolution enhancement technology.

17.   The laser printer of claim 12, wherein said resolution enhancement procedure includes resolution doubling technology.

18.   The laser printer of claim 12, wherein said dynamic switching procedure is used for printing a complex bitmap image, said complex bitmap image may include text, line art and halftone imagery, said dynamic switching procedure comprising:
a superset of image processing templates configured for a plurality of image enhancement
        procedures said plurality of image enhancement procedures comprising said toner
        conservation procedure, said resolution enhancement procedure and said halftone
        enhancement procedure;
said complex bitmap image stored at a bit depth suitable for processing by all of said
        plurality of image enhancement procedures;
said superset of image processing templates windowed over said stored complex bitmap
        image to identify regions in said complex bitmap image suitable for processing by
        one or more of said plurality of image enhancement procedures;
one or more of said plurality of image enhancement procedures selectively applied to said
        identified regions to enhance a raster image of said complex bitmap image; and
said enhanced raster image being printed.

19.   The laser printer of claim 18, wherein said resolution enhancement procedure includes resolution enhancement technology.

DOCKET NO. 10002891-1

20.   The laser printer of claim 19, wherein said dynamic switching procedure allows said resolution enhancement technology to smooth fine black and white edges in said stored complex bitmap image and simultaneously allows said toner conservation procedure to lighten full black areas in said stored complex bitmap image.

21.   The laser printer of claim 18, wherein said resolution enhancement procedure includes resolution doubling technology.